

Model Walk-Through

IV. MODEL WALK-THROUGH

A. Estimation of Total Switched Access Minutes Replaced by non-local VoIP

The model uses a “bottom-up” approach to estimating total switched access minutes replaced by VoIP traffic subject to the *Level 3 Petition*.³⁰ This procedure utilizes two key data points and a series of user-adjustable inputs. The first data point consists of industry forecasts of VoIP *line counts* in the U.S.³¹ VoIP line counts replacing RBOC and non-rural other ILEC switched lines are estimated from total forecasted U.S. VoIP lines by applying the percentage of RBOC and non-rural other ILEC USF loops to total USF loops,³² thereby removing VoIP lines attributable to non-RBOC *rural* ILEC territories. VoIP line count projections for RBOC and non-rural other ILECs are split further by

³⁰ The baseline year for access revenue and MOU data is 2003, the year covered by the most recently available ARMIS reports, and a year when IP-PSTN and incidental PSTN-PSTN VoIP traffic can be assumed to be wholly *de minimis*. Interstate Switched Access Minutes of Use for 2003 for RBOC and non-rural other ILECs are taken from the 2003 NECA network usage report. (<http://www.fcc.gov/wcb/iatd/neca.html>) Intrastate switched access minutes are estimated (NECA usage report for 2003 does not contain intrastate data) using the ratio of interstate to intrastate Dial Equipment Minutes contained in previous NECA network usage reports. Total switched minutes are split between originating and terminating minutes using the ratio of originating to terminating interstate carrier common line minutes for price cap carriers reported by the FCC. The most recent data available are for 2002 contained in the FCC’s Trends Report released in May 2004, Tab 1.4.

³¹ Total U.S. VoIP line counts are taken from the Telecommunications Industry Association (TIA) forecast for U.S. residential and business VoIP line counts for 2004-2007 (http://www.tiaonline.org/media/may04_tech_trends.pdf). The TIA forecast was chosen over other industry forecasts because it was the only available source that provided projections for both residential and business line counts. Other VoIP forecasts focused on residential VoIP market, which is expected to grow at a different rate than the business VoIP market. The VoIP line count for 2008 (not in the TIA forecast) was projected using a quadratic polynomial function. This projection was based on the observation that this functional form fits the TIA forecast for 2004-2007 better than other alternatives such as linear and exponential functions. Other VoIP forecasts reviewed in conducting this analysis include the following: (1) Yankee Group Report, *Despite Uncertainty, Leading Telephony Industry Players Commit To Mass Market VoIP Deployment* (June 2004); (2) Juniper White Paper, *Voice Over IP – Into the Mainstream* (May 2004); <http://www.juniperresearch.com/pdfs/VoIP%20white%20paper%20cover%20+%20contents%201.pdf>; (3) Analysys Report, *VoIP in the US Market: Services, Business Models and Regulation* (March 2004), cited on the PRWeb Press Release News Wire, “VoIP is Turning Point for US Telecoms, Says Analysys,” (April 24, 2004); (4) JupiterResearch Report, *Broadband Telephony: Leveraging Voice over IP to Facilitate Competitive Voice Services*, vol.2 2004, (August 23, 2004); (5) Atlantic-ACM Report, *VoIP Revolution 2004-2009 The Opportunity. The Market. The Players.* (October 2004).

³² NECA 2004 submissions (2003 data) for category 1.3 (switched) loops. A user-adjustable input to measure potential rural lag in adopting high-speed internet access lines is also incorporated into the model. However the default value has been set at one, reflecting no rural lag, based primarily on the recent FCC report on broadband, showing that the “divide between urban and rural areas...is shrinking dramatically.” *Availability of Advanced Telecommunications Capability in the United States*, Fourth Report to Congress, (September 9, 2004) (Statement of Commissioner Kathleen Abernathy) at 4.

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broadband connection type, *i.e.*, DSL versus cable modems (as described later, an adjustment is made for VoIP services supported by fixed special access circuits as well). Data related to VoIP lines supported by either DSL or cable modems was compiled using industry projections for the high-speed Internet market share of each respective technology.³³ The second key data point is the currently-observed average *per-line access minutes-of-use* for RBOC and non-rural other ILECs.³⁴

The first group of user-adjustable inputs is designed to refine the total VoIP replacement minutes so as to identify only those VoIP replacement minutes that will impact ILEC switched access revenues. The first of these inputs removes from the total VoIP line counts those lines that would not replace ILEC switched access services. Specifically, this input is meant to identify (a) VoIP lines adopted by business customers relying upon special access circuits (and hence, switched access minutes are not replaced), (b) VoIP lines that substitute CLEC switched access lines and (c) VoIP lines that substitute (or supplement) wireless service. These VoIP lines are removed from the analysis because they do not replace RBOC and non-rural other ILEC switched access services and would therefore have no direct impact on ILEC switched access charge revenues. Though available as a user input in the model, the default value for *VoIP line counts replacing CLECs* is estimated by using the actual CLEC wireline market share (14.9% in June 2004).³⁵ The default value for VoIP lines replacing/supplementing wireless is based on data showing approximately 6%³⁶ of U.S. households (or 7.25 million households³⁷) have completely “cut the cord” (or completely substituted landline service in favor of wireless). The default value for special access lines was estimated using information comparing enterprise VoIP lines with total VoIP line counts.³⁸

³³ Market share forecasts are from UBS Investment Research High Speed Data Update for 4Q03, March 11, 2004, Tab 4.

³⁴ VoIP Impact Model, LEC Access MOUs Tab.

³⁵ See *Local Telephone Competition: Status as of June, 2004*. FCC, Wireline Competition Bureau, Industry Analysis and Technology Division December 2004 (posted January 2005). This number excludes total service resale lines.

³⁶ The Census Bureau estimates that 6% of households have “cut the cord” nationwide. See *Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation; For Consent to Transfer Control of Licenses and Authorizations*; File Nos. 0001656065, et al., Memorandum Opinion and Order, 19 FCC Red 21522, 21614 ¶ 241 (2004).

³⁷ According to the Census Bureau, there were 120,879,390 housing units as of July 1, 2003 <http://www.census.gov/popest/housing/tables/HU-EST2003-01.pdf>

³⁸ Because of the lack of data on end-user special access lines being substituted for VoIP, the model assumes that a portion of enterprise VoIP lines (rather than small business or residential VoIP) would be substituting special access. We assumed it to be one half of enterprise lines (statistically, this constitutes an appropriate proxy in the absence of any other information as it is equal to the expected value of a uniformly distributed random variable that can take values within a given interval). The shares of enterprise VoIP lines in total VoIP lines were taken from the news release on the Analysys Report “VoIP is a turning point for US Telcoms, says Analysys,” April 24, 2004 (<http://www.prweb.com/releases/2004/4/prweb120716.htm>) – to our knowledge, the only publicly-

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The second group of user-adjustable factors reflects the expectation that VoIP users have different calling patterns than average toll customers. Specifically, average toll (or non-local) call volumes for VoIP subscribers are likely to be higher than the average toll call volumes associated with conventional PSTN toll service. This assumption is based on the fact that non-local calling is price sensitive, and those consumers first to adopt VoIP services will do so because they have a relative advantage for doing so (*i.e.*, they generate high toll volumes and are likely to save the most money by switching to the largely flat-rated pricing packages offered by VoIP carriers).³⁹

In sum, total VoIP non-local minutes replacing ILEC switched access minutes is a product of VoIP line counts replacing ILEC switched access lines, average per-line access minutes-of-use and the adjustment factors described above.

B. Estimation of Access Volumes Subject to the Forbearance Petition

A further adjustment is made to narrow down VoIP minutes to those that are subject to the *Level 3 Petition*. This adjustment captures calls from PSTN to VoIP that are locally dialed and terminate non-locally.⁴⁰ Such situations would arise if a VoIP customer resides in the same local calling area as the calling party, but is temporarily traveling outside this calling area, or if a VoIP customer ports/selects a phone number to another local calling area.⁴¹ In other words, volumes associated with calls from a PSTN customer to a VoIP customer that terminate non-locally using 1+ or 10XXX are excluded from the model.⁴² The model performs this adjustment by applying a user-adjustable input representing the *probability that a locally dialed call is terminated non-locally* to terminating volumes replaced by VoIP.

available VoIP forecast that details VoIP line counts of both residential and business customers. Note that the same report projects that the share of enterprise customers will decrease over time.

³⁹ *VoIP Impact Model*, POTS vs. VoIP Price Comparison Tab.

⁴⁰ Level 3's Petition also requests forbearance for incidental PSTN-PSTN traffic. Due to this traffic being incidental in nature, the model does not attempt to capture this traffic.

⁴¹ In this sense, the number is not "ported" as that term is generally used in the industry. The number is simply assigned to a customer in a geographic region outside that generally associated with the number's area code and exchange code.

⁴² Level 3 has clarified that it has not sought forbearance with respect to traffic that originates from a PSTN caller using a 1+ or 10XXX dialing arrangement. In those situations, the ILEC routes the call to the presubscribed or caller selected IXC, and the IXC delivers traffic to the LEC serving the VoIP provider, with access charges continuing to apply to the exchange between the ILEC and the IXC. See *Level 3 Petition* at 7-8.

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C. Modeling the Impact of the Compensation Regime in Non-local VoIP minutes

A group of user-adjustable inputs accounts for the different calling patterns that are likely to stem from the different types of intercarrier compensation that the FCC could apply as a result of the *Level 3 Petition* – i.e., reciprocal compensation or interstate switched access. These inputs are included to reflect the fact that there is positive correlation between intercarrier compensation rates and end-user toll rates since network access and interconnection are direct inputs to the production of toll services. As intercarrier compensation rates increase, toll rates will also increase. Both economic theory and the empirical data⁴³ suggest that toll call volumes tend to increase when toll prices decrease. To account for an increase in call volumes of customers who switch from PSTN toll to VoIP, the model applies a positive adjustment factor to originating volumes replaced by VoIP. The default value for this factor is different for *Scenarios 1* and *2* because it is assumed that access regime would result in higher VoIP prices compared to reciprocal compensation regime, and VoIP call volumes under the access regime would receive less stimulation (demand suppression relative to a lower intercarrier compensation rate for VoIP traffic). Further, if VoIP toll prices increase as a result of higher intercarrier compensation costs, another dimension of VoIP demand, VoIP subscribership is also expected to be suppressed, which we model through a separate VoIP line suppression factor for *Scenario 2*.

In brief, application of interstate access to VoIP (*Scenario 2*) is modeled as a suppression of VoIP traffic under *Scenario 1* (VoIP under reciprocal compensation) through two user-adjustable inputs, both associated with higher end-user prices compared to *Scenario 1*. These two inputs reduce (i) VoIP line forecasts and (ii) call volumes per VoIP line relative to the level assumed under *Scenario 1*.

D. ILEC Per-Minute Compensation For PSTN Toll and VoIP Calls

The model classifies calls covered by the *Level 3 Petition* into four basic categories depending on whether a VoIP customer is on the originating or terminating side of a call, and whether the VoIP service is based on ILEC (“DSL”) or non-ILEC (“cable modem”) high-speed Internet services. These basic categories are presented in the table below.

⁴³ The analysis of historical interstate minutes and toll prices is included as a supporting worksheet of the Model. See VoIP Impact Model, Price Stimulation of AMOU Tab.

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Impact of VoIP Compensation Regime on ILEC Intercarrier Compensation (per MOU) Using Rates In Effect as of 2003		
Call Type		ILEC Revenue per Minute of Substitution
Call Type A: PSTN to IP call, locally dialed that terminates non-locally		
A1: Terminates on non-ILEC network ("cable")	Traditional Toll	Orig Access (State and Interstate)
	VoIP Under Recip Comp	ILEC pays Recip Comp
	VoIP Under Interstate Access	Orig Access (Interstate)
A2: Terminates on ILEC network	Traditional Toll	Orig and Term Access (State and Interstate)
	VoIP Under Recip Comp	ILEC pays Recip Comp
	VoIP Under Interstate Access	Orig and Term Access (Interstate)
Call Type B: IP to PSTN call		
B1: Originates on non-ILEC network ("cable")	Traditional Toll	Term Access (Interstate and State)
	VoIP Under Recip Comp	ILEC receives Recip Comp
	VoIP Under Interstate Access	Term Access (Interstate)
B2: Originates on ILEC network	Traditional Toll	Orig and Term Access (Interstate and State)
	VoIP Under Recip Comp	ILEC receives Recip Comp
	VoIP Under Interstate Access	Orig and Term Access (Interstate)

The default values for both originating and terminating access on traditional PSTN-PSTN calls are calculated as a *blended access rate* – a rate that is derived as a weighted average of current interstate and intrastate switched access rates. The average interstate switched access rate utilized by the model is \$0.006 per minute and the average intrastate switched access rate is \$0.025 per minute.⁴⁴ Due to the continuing state/federal efforts to remove implicit subsidies from access rates and establish an equitable intercarrier compensation regime, the model includes a user-adjustable input that allows the user to assume future access price changes. In modeling *Scenario 1*, the model utilizes a per-minute reciprocal compensation rate of \$0.0007 – the rate for ISP-bound traffic.⁴⁵

⁴⁴ Average interstate and intrastate rates are taken from Ex Parte Brief of the Intercarrier Compensation Forum, filed October 5, 2004, CC Docket No. 01-92 (Appendix C, rates for large ILECs). Weighting was based on the data point used elsewhere in the model – interstate/intrastate split for Dial Equipment Minutes reported in NECA Network Usage reports (the most recent year for which these data are available is 2000).

⁴⁵ See Rates established in *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Intercarrier Compensation for ISP-Bound Traffic*, Order on Remand and Report and Order, 16 FCC Rcd 9151 (2001) ("ISP Remand Order"). For a recent reference, see

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E. Calculation of Total Inter-carrier Compensation Revenue Impact of Applying Access Charges to IP-PSTN VoIP

The total direct dollar impact of applying access charges to IP-PSTN VoIP is calculated as the difference between (a) ILEC net inter-carrier compensation revenue associated with non-local VoIP volumes under *Scenario 1* and (b) ILEC net inter-carrier compensation revenue associated with non-local VoIP volumes under *Scenario 2*. Total revenue under each scenario is calculated as a product of the per-minute revenue impact and the corresponding VoIP replacement minutes.

F. Additional Impact due to DSL Stimulation

The model considers additional ILEC DSL revenue stimulated by VoIP traffic, specifically revenue for DSL lines that would be ordered primarily, or in part, because customers wish to use VoIP services. Since a broadband connection is a prerequisite to VoIP service, for some customers, VoIP will be the primary driver in the decision to purchase a DSL connection. In an effort to model the impact of the DSL revenues generated by these customers, the model incorporates a user-adjustable input that assumes a certain portion of DSL-based VoIP lines (established in the model generally as described above)⁴⁶ would be “caused” by the end-users’ decisions to obtain VoIP. The default value of this user-adjustable input is set to 15%, meaning that 15% of all DSL-based VoIP lines are induced by consumer demand for VoIP services.⁴⁷ This percentage is applied to the projected VoIP line counts that are DSL based.

The resulting DSL line counts associated with VoIP stimulation are translated into revenue by applying a user-adjustable input *the assumed monthly price of DSL service*. The default value for this price is set to \$30 and is based on a review of current

Petition of Core Communications, Inc. for Forbearance Under 47 U.S.C. § 160(c) from Application of the ISP Remand Order, Docket WC No. 03-171 at 6 (rel. October 18, 2004). Note that in the ISP Remand Order, the FCC required that ILECs who select the \$0.0007/minute rate for ISP-bound traffic must offer to compensate all non-access traffic at this rate.

⁴⁶ DSL-based VoIP line count used in this calculation is somewhat different from the DSL-based line count used to derive toll volumes (“the main calculation”) because the former is designed to measure additional DSL revenue to ILECs due to VoIP, while the latter measures VoIP volumes that substitute ILECs’ switched access service. Here, we do not exclude VoIP line counts substituting special access or wireless. In addition, adjustment for CLEC DSL lines is made by incorporating CLEC market share in DSL lines (while the main calculation uses CLEC market share in total lines).

⁴⁷ According to a report from Technology Futures, Inc., new IP services such as VoIP and IP video are driving the push to higher broadband adoption, and 50% of U.S. households will subscribe to broadband access by 2006. See Press Release “U.S. Lags In Broadband Adoption Despite Demand For VoIP, IP Video: Report.” Networking Pipeline, December 16, 2004.

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residential DSL offerings from the RBOCs.⁴⁸ Note that the default monthly charge does not include one-time installation and conditioning charges or rental of DSL modems.

G. Impact of the Level 3 Petition Is Compared to Total Access Revenue

The total impact of the *Level 3 Petition* is compared to total switched access revenues of RBOC and non-rural other ILECs on the model's "Results" worksheets and charts.

Results

Results – Impact of Applying Access

The *Results – Impact of Applying Access* Tab summarizes the results in tables and graphs. It depicts the difference in ILEC intercarrier revenues under *Scenarios 1* and *2* in isolation from other revenues (Chart 2) and relative to total switched access revenues (Charts 1 and 3).

This Tab makes an additional projection: it derives a forecast of future switched access revenue by incorporating its internal user-adjustable assumptions about the future changes in access rates (used in the main calculations of VoIP impact) and an assumption that the current trend in switched access *minutes* will continue.⁴⁹ Note that the current trend in minutes was calculated from the most recently available data, which is the change between the two most recent 12-month periods available, July 2002 – June 2003 and July 2003 – June 2004⁵⁰ – periods during which VoIP was not a significant factor in access revenue decline.⁵¹

Results – VoIP vs. Wireless

The model makes an additional projection in the *Results – VoIP vs. Wireless* Tab by estimating access revenue lost to wireless telephony. This is accomplished in three steps. First, the volumes of wireless minutes associated with non-local calls are estimated. This

⁴⁸ Residential DSL pricing plans for October 2004 are as follows: SBC Express (385Kbps-1.5Mbps down/128Kbps up) = \$26.95/mo.; SBC Pro (1.5-3Mbps down/384Kbps up) = \$36.99/mo.; Qwest Choice DSL Deluxe w/MSN Premium (without qualifying home package) = \$31.99/mo. for first 3 mos. and \$44.99/mo. thereafter. BellSouth Fast Access DSL Lite (256Kbps up/128Kbps down) = \$34.95/mo. (base price); BellSouth Fast Access DSL Ultra (1.5Mbps down/256Kbps up) = \$42.95/mo. Verizon DSL \$34.95/mo. (without commitment). RBOC average DSL price (basic, *i.e.*, slowest speeds) = \$32.21.

⁴⁹ The exact formula is "projected rate of change in access revenue = (1+rate of change in access rates) * (1 + rate of change in access volumes) – 1."

⁵⁰ Interstate switched access minutes of Tier 1 ILECs reported by NECA. (<http://www.necainfo.org/source/NecaInfoMainPage.asp>). Similar intrastate data are not available. Twelve-month data were used to remove any possible seasonal fluctuations.

⁵¹ VoIP Impact Model, Results – Impact of Applying Access Tab, row 52.

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is done by applying the percentage of wireless calls that are interstate⁵² to total wireless minutes reported by the industry for 2003.⁵³ Wireless non-local minutes are added to wireline access interstate minutes in 2003⁵⁴ to generate a hypothetical total “demand for non-local minutes” – *i.e.*, minutes that would be likely be carried over the PSTN network in 2003 if wireless service did not exist. It is assumed that the same proportion “wireline to wireless minutes” holds for intrastate non-local traffic. Second, the share of wireless non-local minutes in this “total demand” is calculated and applied⁵⁵ to baseline 2003 switched (interstate and intrastate) access revenue. The result is the hypothetical access revenue that ILECs would have received in 2003 if wireless telephony did not exist.⁵⁶ Third, in order to project this hypothetical revenue to years past 2003, wireless non-local minutes were forecasted by extending the observed trends. The annual change in hypothetical access revenues lost to wireless is derived from the forecasted annual change in wireless non-local minutes and the model’s internal user-adjustable assumptions about the future changes in access rates (used in the main calculations of VoIP impact).

Chart 4 illustrates these results by comparing the hypothetical access revenues attributable to total demand for non-local (wireline and wireless) minutes to the impact of VoIP substitution. The purpose of this projection is to illustrate how two technologies – wireless and VoIP – affect the ILECs’ access revenues.

⁵² The FCC Trends Report May 2004 Table 11.4 contains the distribution of residential wireless calls between state and interstate for 2000-2002. The model projects these data to 2003 using the Microsoft® Excel linear trend function.

⁵³ This is the most recent year available. CTIA Annual Survey for the end of year 2003.

http://files.ctia.org/pdf/CTIA_Semiannual_Survey_YE2003.pdf

⁵⁴ NECA Network Usage data for 2003 for all companies (non-rural and rural).

⁵⁵ The exact formula is “baseline revenue over (1 – wireless share).”

⁵⁶ For simplicity of presentation, this analysis ignores specific intercarrier compensation streams between ILECs and wireless. In particular, the model does not account for intercarrier compensation revenue “gains” to ILECs stemming from the stimulation effect that wireless prices are likely having on call volumes. Likewise, the model does not account for intercarrier compensation “losses” that ILECs incur because of jurisdictional differences, *i.e.*, where a wireless call to an ILEC customer substitutes local toll call and is compensated at reciprocal compensation rates rather than intrastate access rates.

Explanation of User-Adjustable Inputs

V. EXPLANATION OF USER-ADJUSTABLE INPUTS

As explained above, the *VoIP Impact Model* is robust in that it incorporates user-adjustable inputs that can be changed if better data becomes available. Through these inputs, the model allows users to perform sensitivity analyses (see User-Adjustable Inputs Tab). The model automatically recalculates results when user-adjustable inputs are modified. This section of the report describes the user-adjustable inputs chosen by QSI (the model's "default" values) including QSI's supporting rationale.

A. VoIP Substitution

As described above, not all VoIP line increases will result in ILECs losing switched access revenues. This is due to the fact that some adopters of VoIP have already left the ILEC's switched access products and are served by CLECs, or have completely "cut the cord" in favor of wireless service. In addition, some ILEC customers will adopt VoIP as a second line (in addition to the ILEC primary line) and, as a result, subscription to one VoIP line will not result in the ILEC losing 100% of the access charge revenue attributable to that customer because these customers will continue to receive calls on their ILEC line. In these instances, ILECs will continue to receive terminating access revenue. Finally, a user-adjustable input has been incorporated to recognize that some business customers who adopt VoIP have already replaced ILEC lines relying upon switched access with special access instead, and hence, these VoIP services will have no impact on ILEC switched access revenues. These user-adjustable inputs are described in more detail below:

% of VoIP Lines Attributable to Wireless Subscribers (User-Adjustable Input # 1)⁵⁷

User-Adjustable Input and its 2005 default value:

% of VoIP lines attributable to customers who have already replaced wireline service with wireless service (or "cut the cord")	5%
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A growing number of customers are turning from traditional landline service, and opting to rely instead on wireless service. According to JupiterResearch, among users between the ages of 18 and 24, 12% use cell phones as their only phones, and have no wireline connection whatsoever.⁵⁸ A recent study by In-Stat/MDR reports that 5% of all U.S.

⁵⁷ VoIP Impact Model, User-Adjustable Inputs Tab, row 5.

⁵⁸ JupiterResearch, "Broadband Telephony: Leveraging Voice Over IP to Facilitate Competitive Voice Services," August 23, 2004; at 5.

Explanation of User-Adjustable Inputs

households have abandoned their wireline in favor of cell phones (another data point discussed in footnote 26 quotes a higher number, 6% of households). Moreover, the Stat/MDR study projects that the percentage of wireless consumers in the United States that will “cut the cord” to the ILEC will increase to 30% by 2008.⁵⁹ Clearly, a growing portion of telecommunications consumers are migrating away from the traditional landline ILEC provider in favor of wireless only service.

This landline to mobile substitution effect results in a diminished ILEC access charge revenue impact due to VoIP substitution, since wireless users who have cut the cord to ILECs are already, for the most part, avoiding ILEC switched access charges and will therefore not reduce switched access revenues further by subscribing to VoIP (regardless of the intercarrier compensation mechanism adopted by the FCC). The model accounts for this by incorporating a user-adjustable input that reduces the VoIP line counts included in the analysis to remove line counts attributable to wireless-only customers. Though reliable industry projections indicate that as many as 30% of Americans will “cut the cord” by 2008, the QSI model takes a conservative approach and assumes that only 5% (through 2008) of total VoIP lines are attributable to “wireless only” customers.

% of VoIP Lines Attributable to Special Access Substitution (User-Adjustable Input #2)⁶⁰

User-Adjustable Input and its 2005 default value:

% of VoIP lines attributable to business customers who have already substituted special access services for their switched access lines	35%
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A significant portion of VoIP adoption is anticipated to come from the business sector. Due to differences in calling patterns relative to residential customers, business customers are far more likely to rely upon special access as opposed to switched access to connect to the PSTN. Because customers relying upon special access do not pay switched access charges (indeed that is one of the primary advantages to special access), as those customers adopt VoIP, they will not further reduce the ILEC switched access revenues. The model recognizes this circumstance by providing a user-adjustable input that accounts for the fact that a certain portion of VoIP access line adoption will not impact ILEC access charge revenue because they are supported by special access services (and do not replace switched access lines). Values for 2004 and 2008 were calculated as a mid point between zero and industry estimates for the percent of enterprise customers in total VoIP lines. Values for 2003 and 2005-2007 were estimated to achieve a downward sloping pattern that reflects industry forecasts predicting that the percent of non-enterprise VoIP customers will grow over the period.

⁵⁹ From Many Telecom Markets, One? The Deal LLC – Corporate Control Alert. June 23, 2004.

⁶⁰ VoIP Impact Model, User-Adjustable Inputs Tab, row 6.

Explanation of User-Adjustable Inputs

% of VoIP Lines Attributable to CLEC Customers (User-Adjustable Input #3)⁶¹

User-Adjustable Input and its 2005 default value:

% Switched Access Lines that are CLEC Lines (not ILECs)	14.90%
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According to FCC data, CLEC lines grew at a rate of 10% during the second half of 2003, from 14.7% to 16.3% of the total nationwide end-user access lines in service.⁶² This growth in CLEC market share continued into June, 2004, increasing from 16.3% to 17.8%.⁶³ This increase in CLEC market share results in a diminished ILEC switched access charge revenue impact due to VoIP substitution. Since CLEC customers who have already migrated from an ILEC to a CLEC (save total service resale lines) already avoid ILEC switched access charges, their decision to use a VoIP service will not further reduce ILEC switched access revenues. The model recognizes this by providing a user-adjustable input that removes from the VoIP line counts those lines attributable to CLEC customers. The user-adjustable input reflects the CLEC market share less total service resale lines because customers of CLECs competing on a total resale basis contribute to ILEC switched access revenues and, therefore, those customers when choosing VoIP will impact ILEC switched access revenues. According to the FCC's *Status of Competition Report June 30, 2004*, CLEC market share less total resale lines for 2003 and midyear 2004 was 13.6% and 14.9%, respectively.⁶⁴

QSI contends that the factor selected for this input is conservative, even if UNE-P line counts decline during the study period. Consistent with recent industry research,⁶⁵ it is expected that ILEC line loss to cable telephony will grow to be comparable in numbers to those lost to UNE-P.

VoIP as a Second Line (User-Adjustable Input #9)⁶⁶

User-Adjustable Input and its 2005 default value:

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- ⁶¹ VoIP Impact Model, User-Adjustable Inputs Tab, row 7.
- ⁶² FCC, Wireline Competition Bureau, Industry Analysis and Technology Division, Local Telephone Competition as of December, 31, 2003 (rel. June 2004). See Table 1.
- ⁶³ FCC, Wireline Competition Bureau, Industry Analysis and Technology Division, Local Telephone Competition as of June, 2004 (rel. December 2004). See Table 1.
- ⁶⁴ FCC Status of Competition: June 30, 2004, calculated from data in Tables 1 and 3.
- ⁶⁵ *Cable and Telecom: VoIP Deployment and Share Gain Accelerating; Will Re-Shape Competitive Landscape in 2005*, Bernstein Research Call Report (December 7, 2004). ("For the Regional Bell Operating Companies (RBOCs), the recently observed moderation in access line losses to wholesale competitors is at best the 'calm before the storm.' Lines lost to cable telephony will accelerate in the next few quarters, and will eventually be comparable in number to those lost to UNE-P; but unlike UNE-P losses, losses to cable telephony will provide no offsetting wholesale revenue.")
- ⁶⁶ VoIP Impact Model, User-Adjustable Inputs Tab, row 13.

Explanation of User-Adjustable Inputs

Incomplete "migration of calls to VoIP": VoIP customers who retain ILEC line continue to receive incoming "non-local" calls on the ILEC line (factor)	0.8
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Traditionally, ILEC-provided *second* lines have served a fundamentally different purpose than ILEC-provided *primary* lines. Consumers have traditionally used second lines for fax lines, "teen" lines and for uninterrupted access to the internet via dial-up connections. Wireless technologies, and more recently broadband services, are now providing alternatives for such second lines, and demand for second lines has decreased.⁶⁷ However, some VoIP adopters will be reluctant to completely migrate away from the ILEC landline PSTN services until they are comfortable that any service quality issues (real or perceived) regarding VoIP are resolved. As a result, consumers may use a VoIP line to make long distance calls (due to lower long-distance prices), but continue to use traditional PSTN service for local calling and for incoming calls.

The anticipated growth in these VoIP second lines results in a diminished ILEC switched access charge revenue impact due to VoIP substitution because of the fundamental difference in how these VoIP lines are likely to be used by consumers. Since consumers may be reluctant to rely upon VoIP as their only line,⁶⁸ consumers attracted to VoIP on the basis of price will utilize VoIP for making long distance calls. Moreover, because of the high degree of reliability often associated with PSTN service, many consumers will retain their traditional service and continue to receive long distance calls on that line. Because of this fundamental difference, it would be inappropriate to assume that a VoIP second line has the same impact on ILEC access revenue loss as a consumer who adopts VoIP as a primary line. The model recognizes this by incorporating a user-adjustable input that accounts for the portion of VoIP adopters that will adopt VoIP as a second line and continue to contribute to ILEC switched access revenues. QSI selected a conservative default value of 0.8, meaning that the customer migrates 80% of his/her incoming calls to the VoIP line and continues to receive 20% of incoming calls on the ILEC PSTN line.

B. VoIP Customer Calling and Adoption Characteristics

Early adopters of VoIP will likely exhibit higher usage patterns than the average PSTN customer, and the model has been designed to incorporate user-adjustable inputs that account for these differences.

⁶⁷ FCC, Wireline Competition Bureau Industry Analysis and Technology Division, Trends In Telephone Service (rel. May 2004) at 7-1.

⁶⁸ JupiterResearch, "Broadband Telephony: Leveraging Voice Over IP to Facilitate Competitive Voice Services," August 23, 2004 at 6.